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erous financial aid accorded by the Royal Society he has been enabled to publish the full treatise at the Clarendon Press.[2] Dr. Ewart's observations upon protoplasmic streaming have extended over eight years. The treatise shows complete familiarity with the somewhat extensive literature bearing directly upon this topic, and the prolonged study has enabled him to review much allied work, both physical and physiological. In these days, when hasty publication is too frequent, the author's mature consideration of his theme and the contemplation of it from many sides may be taken as an example worthy of imitation.

Some conclusions of this book have already been stated in the notice of the preliminary paper.[3] The study of streaming itself has brought Ewart to consider so many other aspects of cell physiology that it is not possible to summarize his conclusions without repeating the three or four pages in which he concisely does this. It must suffice to say that he discusses the influence of various external agents (including an extensive study of chemical, mechanical and etherial stimuli) on streaming; the relation between it and the other functions of the cell; the sources of energy; the influence of viscosity, and the ways in which this is modified by various agents; the analogies between streaming and molecular contraction; the transmission of stimuli and the rate of propagation; the existence of nerve fibrillae as claimed by Němec; the movements of chloroplasts; and finally the theories of streaming.

Typographically the book is issued in the same style as the classical textbooks of Sachs, DeBary, Pfeffer, and others, falling below their high standard only in the figures, which are reproduced from rather crude drawings. It would have been worth while to have a good draftsman put these into proper form. One dislikes to see unsightly illustrations in the midst of fine letter press.—C. R. B.

Biological philosophy.

SEEMINGLY almost all the fundamental problems of modern biology are at least touched upon in a curious work which has recently appeared from the hand of Krašan.[4] The book is of a decidedly philosophical nature and is designed as a sort of introduction to broad and deep scientific thinking. Its field is to some extent similar to that of Pearson's *Grammar of Science*, but the present work deals almost entirely with the facts of botany, and the method of treatment as well as the ideas expressed are quite different from those of the *Grammar*. In Krašan's felicitous illustrations and comparisons of things seemingly dissimilar (*e. g.*, of the animate with the inanimate, etc.), is found

[2] EWART, ALFRED J., On the physics and physiology of protoplasmic streaming in plants. Imp. 8vo. pp. viii + 131. *figs. 17*. Oxford: Clarendon Press. 1903.

[3] See BOT. GAZ. **36**: 71. 1903.

[4] KRAŠAN, F., Ansichten und Gespräche über die individuelle und specifische Gestaltung in der Natur. 8vo. pp. vii + 280. Leipzig: Wilhelm Engelmann. 1903. *M.* 6.

much to remind the reader of the Weissnichtwo Professor of Things in General; for students who have difficulty in seeing a number of sides to the same question the book will surely be an inspiration. Among the topics discussed are: the relation between material and form throughout nature; metamorphosis and substitution; the relation of species, variety, and race; phylogeny; paleobotany, etc.

The work has an almost medieval smack; after a few introductory pages it is written entirely in dialogue, which may make it tedious for him who is only after the kernel of the nut. There is no doubt, however, that the reader's interest is held by these curiously learned dialogues of Fritz, Hans, and the other students, albeit the ludicrous will occasionally arise to obscure the scientific.—B. E. LIVINGSTON.

MINOR NOTICES.

TREES, SHRUBS, and VINES[5] is a book designed especially for New Yorkers, and to them it may be useful. Though it professes to describe these plants in all the northeastern United States, this part is distinctly inferior and secondary. The greater part of the book is devoted to lists of "these three growths" and to "rambles" in Central Park, whose glories are fully exploited. To a brief description of native trees, shrubs, and vines 172 pages are devoted, and nearly half as much more to the foreign species grown in Central Park. The descriptions are too brief, lacking in contrasts, and often maddeningly comparative. Species of the same genus are often widely separated. The keys are worthless; *e. g.*, one of the chief distinctions is "widely distributed within territory" and "found only on frontier"—exactly the kind of information that one endeavoring to name an unknown tree is unlikely to possess. If the book sailed under true colors it would be more commendable; but judged according to its title it is far inferior to others of like purpose.—C. R. B.

NOTES FOR STUDENTS.

DUDE,[6] studying both fungi and higher plants, finds that the replacement of oxygen by purified hydrogen can be withstood by spores and seeds for a long time (in seeds fifteen to fifty days), but that their germination is much delayed. The vegetative tissues are injured irreparably after an hour or at most a few hours, the younger being most easily killed; yet meristematic tissues endure the hydrogen for three to five days. In all conditions a higher temperature accelerates the action.—C. R. B.

DR. B. LONGO[7] holds that the pollen tube is the only channel by which the embryo of Cucurbita can receive nutriment, because of the marked cutini-

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[5] PARKHURST, H. E., Trees, shrubs, and vines of the northeastern United States. 12mo. pp. viii + 451: Illustrated. New York: Charles Scribner's Sons. 1903. $1.50.

[6] DUDE, MAX, Ueber den Einfluss des Sauerstoffsentzuges auf pflanzliche Organismen. Flora **92**: 205–252. 1903.

[7] LONGO, B., La nutrizione dell' embrione delle Cucurbita operata per mezzo del tubetto pollinico. Annali di Botanica **1**: 71–74. 1903.